IN THE CLAIMS

1. (currently amended) An automatic gain adjustment device of a feedback control system that uses ,a phase difference between an output signal obtained from a controlled object and an input signal while controlling the object based on the input signal, the automatic gain adjustment device comprising:

phase shifting means connected to an input stage of the feedback control system for shifting a phase of the input signal, wherein such that a phase shift amount of the phase shifting means is set so that a frequency of the input signal to be supplied to a closed loop coincides with a crossover frequency at which an open loop gain of the feedback control system becomes 0 db;

a multiplier for multiplying the input signal and the output signal obtained from the controlled object;

an integrator for integrating product results of the multiplier and outputting integrated product results; and

a gain setting unit for adjusting a gain of the feedback control system based on a sign of the integrated product results from the integrator so that the open loop gain converges to 0 dB.

2. (canceled)

3. (previously presented)   The automatic gain adjustment device according to claim 1, wherein the open loop gain is converged to 0 dB using a bisection method.

4. (currently amended) An automatic gain adjustment method for a feedback control system that uses a phase difference between an output signal obtained from a controlled object and an input signal while controlling the object based on

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the input signal, the automatic gain adjustment method comprising the steps of:

setting a phase shift amount so that a frequency of the input signal to be supplied to a closed loop coincides with a crossover frequency at which an open loop gain of the feedback control system becomes 0 dB;

shifting a phase of the input signal based on the phase shift amount set in said step of setting;

multiplying the input signal and the output signal obtained from the controlled object;

integrating results of the step of multiplying; and

adjusting a gain of the feedback control system based on a sign of the integrated results so that the open loop gain converges to 0 dB.

5.   (canceled)

6.   (previously presented)   The automatic gain adjustment method according to claim 4, wherein the open loop gain is converged to 0 dB using a bisection method.